

Land, Legacy and Learning

Making Education Pay For Kentucky's Environment

A Master Plan written by citizens of Kentucky
for Environmental Education and the Commonwealth

Sponsored by:
The Kentucky Environmental Education Council, an agency of the Education, Arts and Humanities Cabinet

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Land, Legacy and Learning:

Making Education Pay for Kentucky's Environment

Last year, Kentucky spent millions of dollars to clean up waterways, roads and illegal dumps. Cleaning up illegal dumps alone cost taxpayers \$4.1 million in 1997. If a fraction of this money had been spent to effectively educate people about how they can help prevent pollution, Kentucky would have saved a great deal of this money, both last year, and for years to come. It costs much less to teach people how to prevent environmental problems than it does to clean up those problems. The costs to our health and to the quality and the beauty of the land Kentuckians cherish are harder to measure, but they are additional compelling reasons to invest in the environmental literacy of our citizens.

Education does indeed pay, and environmental education is a perfect example of this. However, because its benefits are not immediately apparent, it has been given a very low priority both in government planning about the environment and in the planning of educational programs. Realizing the need to improve environmental literacy in Kentucky, the Legislature created the Kentucky Environmental Education Council as a state agency in the Education, Arts and Humanities Cabinet. The Legislature charged the Council with the mandates listed below.

- Create and update a five year management plan to improve environmental education programs
- Establish an interagency subcommittee to advise the Council
- Establish regional environmental education centers at all state universities and establish a competitive system for awarding grants to these centers
- Seek private support for funding environmental education programs in the state
- Assist to integrate and evaluate environmental education in the school curricula
- Monitor the environmental literacy of Kentuckians
- Make recommendations to promote environmental literacy in Kentucky

This plan fulfills several of these mandates and suggests strategies for accomplishing the others. Over the past two years, citizens from across the state and from many different environmental perspectives have come together to write it. During this two-year period, over 150 Kentuckians held meeting after meeting, discussed, compromised, wrote and rewrote. They agreed that all Kentuckians must be taught the basic concepts and skills they need to make rational decisions about the environment. Furthermore, they agreed that the twenty recommendations contained in this plan are the most important steps we can take to improve the environmental literacy of all our citizens.

Land, Legacy and Learning lists twenty recommendations, each followed by a brief explanation. Recommendations are grouped under four headings that include **Teach-**



photo courtesy Whitesville Elementary

ing Our Children, Preparing Educators and Training Future Leaders, Reaching Kentucky's Adults, and Creating an Efficient System. Though the recommendations are numbered consecutively, they are prioritized under each heading. While grouped for clarity, the recommendations are strongly related to each other, and those in one section often support those in another. For example, the environmental education centers described in recommendation 9 would help implement many of the other recommendations in the report and therefore are considered very important to improving environmental education in Kentucky.

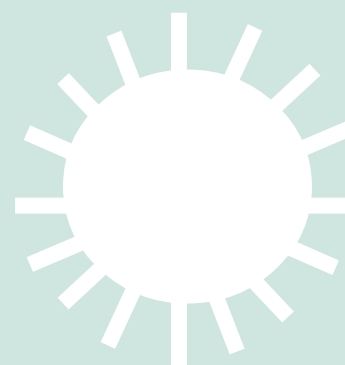
The explanation under each recommendation contains, where appropriate, an estimate of the amount and source of funding needed to implement the recommendation. Also included is a date when each recommendation should be initiated.

Three terms used throughout may need to be defined.

The **Program of Studies**, produced by the Kentucky Department of Education, is a document which lists the concepts and skills each child should learn in each grade level and in each subject, from primary through twelfth grade. Required by law, the Program of Studies was updated last year and is drawn from the national standards of the various disciplines.

A **nonformal educator** is someone who provides educational services but is not part of the formal education system. For example, an interpreter working at a nature center, a forest ranger visiting a school, and an agency employee staffing a booth at an environmental fair are all considered nonformal educators.

KEEC is often used as an abbreviation for the Kentucky Environmental Education Council.





Teaching Our Children



*photo courtesy Kentucky Department of
Travel Development*

While environmental education is important to citizens of all ages, there is no doubt that children are its primary beneficiaries, and central to improving environmental literacy in Kentucky is ensuring that every child in the state receives a balanced, academically-based environmental education as part of the curriculum. This section begins with the recommendation that environmental literacy become part of teacher certification. By improving the environmental literacy of teachers, this single recommendation, while challenging to implement, would significantly improve environmental literacy among our young people.

By recommending standards for environmental education, this section also addresses the controversy that has for so long plagued environmental education. This controversy stems from the perception that environmental education sometimes advocates particular positions on environmental issues rather than providing the basic knowledge our citizens need to make their own decisions. Creating standards for content, materials and instructional models will help teachers and students choose environmental education that is balanced and age-appropriate.

Finally, placing an environmental education consultant in the Kentucky Department of Education will help make teachers and administrators aware of these standards and help infuse environmental education into the curriculum, thus making it available to students across the Commonwealth.

1 Environmental literacy should be a required part of teacher certification.

To have environmentally literate citizens, we must have environmentally literate teachers. While this recommendation does not call directly for funding, its adoption would require many changes in the way we prepare teachers. The implementation of this recommendation would require either legislation or a very significant commitment from those who prepare our teachers. The Task Force realizes that such action is a major undertaking and may require substantial discussion. Nevertheless, we believe it is the single most important step toward improving the quality of environmental education in our schools. Our goal is that significant steps be taken to improve the environmental literacy of teachers by 2004. One step toward that goal would be for the Governor's Teacher Education Task Force to consider this recommendation.

2 The Department of Education should hire a full-time environmental education consultant who works to create instructional models and to infuse environmental education into the curriculum.

Environmental education is truly interdisciplinary. Therefore, since the traditional curriculum is discipline based, environmental education often falls through the cracks in our educational system and is neglected. Hiring an environmental education consultant would both ensure that environmental education is taught consistently in the schools and that it supports the curriculum guidelines set by the Department of Education. Annual costs for funding this position are approximately \$75,000 and would be requested from the General Assembly in the year 2000 session.



photo courtesy Kentucky Department of Travel Development

3

Environmental education content, materials, and instructional models should be standards-based.

There is a national movement to make all education more standards-based, and environmental education is no exception. Indeed, with the widely held perception that much of environmental education is biased or taught from an advocacy viewpoint, rigorous academically-based content and methods take on added importance. The remaining recommendations in this section relate to this one. This recommendation requires no additional funding.

4

The Kentucky Environmental Education Council will appoint a committee of educators to produce a set of standards for environmental education in Kentucky. These standards will be a subset of the Program of Studies and the Academic Expectations. The process employed to select this subset will use the “Environmental Education Guidelines for Learners” developed by the North American Association for Environmental Education. Just like the committee that will review environmental education materials for Kentucky (described in recommendation 5), a panel of citizens with a wide range of expertise and viewpoints on environmental and educational issues will review these standards when they are completed.

This recommendation simply lays out what standards environmental education will follow in Kentucky. A panel of expert educators will choose those concepts and processes from the Program of Studies that are most essential to quality environmental education in the schools. The rationale behind using the Program of Studies as the basis for environmental education standards is to ensure that



photo courtesy Kentucky Department of Agriculture

teachers don't have still another set of standards to which they must adhere. It also ensures that the environmental education standards for the Commonwealth mesh with already existing goals for Kentucky schools.

Costs for identifying these standards would be approximately \$12,000, including travel costs, stipends for the educators, and costs for printing and distribution. This money would be raised from private sources. Since identifying these standards serves as the basis for several other recommendations, fundraising for this process will begin immediately upon presentation of the plan, with completion planned for December 2000.

5

A committee should be established to review environmental education materials used in Kentucky schools. This committee would include both educators and people with a wide range of expertise and viewpoints on environmental issues. For materials that have already been reviewed by the North American Association for Environmental Education, the committee will defer to those recommendations. For Kentucky-specific materials or for materials that have not been reviewed, the committee will use the standards from the Program of Studies to assess the quality and balance of materials. In addition to committee review, materials will be field tested by experienced teachers, and their recommendations will be part of the entire review process.

The point of this recommendation is to create a procedure that helps teachers screen environmental education materials for quality, fairness and accuracy. Like all curriculum materials, the thousands of environmental education materials available to teachers are of variable quality and intent; some may even advocate a particular viewpoint about environmental issues. Since this process will be ongoing, KEEC funds will be used to pay the approximate \$10,000 a year costs for reviewing materials. The review process will begin in June of 2000.

This would not preclude any teacher from using any materials he or she wishes. It would only make it easier for teachers to find quality materials that help teach the concepts that children already need to know, based on the Program of Studies.

6

Professional development opportunities should be provided that help teachers use recommended environmental education models effectively. Professional development for teaching about the environment should be based on the Program of Studies and Academic Expectations and should conform to the professional development strategies implemented by the Department of Education.

Since the goal of professional development in environmental education is to help teachers use environmental topics to teach concepts already required in the curriculum, professional development opportunities should strive to make environmental education an integral part of the curriculum, rather than only an occasional experience in only a portion of the schools. The KEEC and the Kentucky Department of Education should work together to implement this recommendation. The two recommendations that follow relate to recommendation 6.

Efforts are well under way to create instructional models that use environmental topics to implement the Program of Studies. The KEEC, working with numerous other environmental education providers, has already created models for grades 4, 6, and 8. Models are under construction for grades 7 and 10. Plans are also under way to create a pilot project which would enroll teachers in a content-based “academy” where they would study ecology at the college level and then do research on their local ecosystems.

Both the instructional models and the academy are examples of how the environmental education community and the Department of Education can work together to infuse environmental education into the professional development of teachers. A mixture of state, private, and federal funding will be used to continue to create these opportunities. No new state funding will be requested for this ongoing process.

7

Environmental education instructional models should be based on criteria listed below. Instructional models should:

- be standards based (based on the Program of Studies)
- contain hands-on activities that lead to problem solving and critical thinking
- have community-based instruction
- be interdisciplinary
- include authentic assessments
- be age appropriate
- use inquiry-based approaches
- use scientific processes to study interactive systems
- serve all students
- promote independent thinking
- address social, cultural, and physical diversity

The purpose of this recommendation is to raise both the quality and consistency of the methods used to teach our students about the environment. Many teachers already know that environmental education is good education.

National research shows schools that use their local environments as a theme to integrate the curriculum make strong gains in numerous educational outcomes including standardized test scores, the ability of students to solve real world problems, and the reduction of discipline problems. By creating instruc-



photo courtesy Kentucky Department of Parks

tional models, teachers are given some of the tools they need to teach both the skills and the content students must already master.

Dissemination of these models, and of the national research that supports them, is already planned through workshops sponsored by KEEC's Resource School Network. Through the professional development opportunities described in recommendation 5, KEEC will also distribute information explaining the best methods for teaching about the environment. Both these efforts are currently funded by KEEC and by federal grants and will continue through 1999 and 2000.

- 8 The primary distribution route for instructional models should be through the Department of Education. Instructional models distributed by other sources should align with the Program of Studies. These models should be made available in various formats including video, CD-ROM and print.**



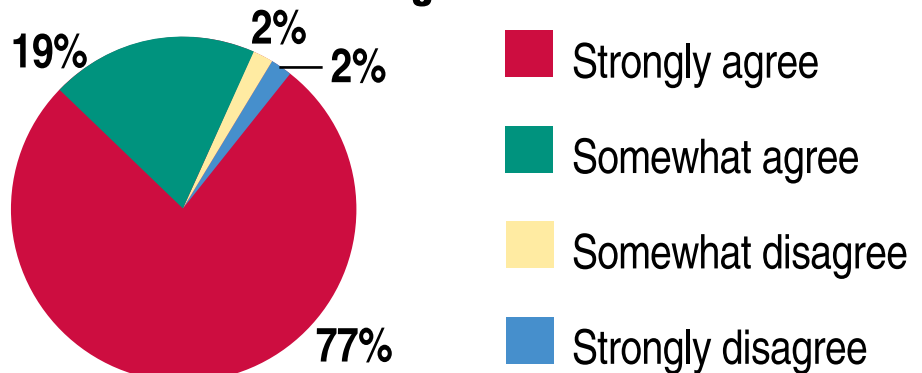
photo courtesy Gailand Elementary

Distributing instructional models through the Department of Education does two things. First, it creates a more direct route for environmental education materials and information to reach the schools. Second, it ensures that instructional models for environmental education conform to the Department of Education's standards. This cooperation, in turn, ensures quality and consistency.

Once again, there is no mandate to distribute environmental education models through the Department of Education. However, KEEC will encourage agencies and organizations to do so whenever possible and will assist them to work with the Department as well.

This recommendation requires no additional funding; however, it does require increased cooperation among the agencies and organizations that distribute environmental education models and programs. This, in turn, will require more effort by the KEEC staff to coordinate these efforts. They will begin working to encourage this coordination in the fall of 2000.

Percentage of Kentuckians Who Believe Environmental Education Should Be Taught in the Schools



Preparing Educators & Training Future Leaders



All students who graduate from a Kentucky college or university should achieve a level of environmental literacy sufficient for them to understand how their own individual actions affect the environment, and how the environment is affected by public policy decisions. Many college students in Kentucky, including those preparing to be teachers, now complete their four-year undergraduate degrees and even graduate work without ever achieving this basic level of environmental literacy.

We believe the most effective way to address this problem is to create a Center for Environmental Education at each state university. These centers will serve as catalysts to improve the way college and university students, elementary and secondary teachers and the general public learn about their environment. The General Assembly mandated the creation of these centers in KRS 157.915(3). KRS 157.900(3) states that one of the functions of the Kentucky Environmental Education Council is to “establish and help coordinate the activities of regional environmental education centers and advisory committees at all state universities to serve as networks for the dissemination of environmental education programs, materials and information across the state.” We are now requesting that the Legislature provide funding for those centers.



photo courtesy Kentucky Department of Agriculture

The following recommendations describe the functions of environmental education centers at all state universities.

9

A statewide network for environmental education should be created, including a center at each state university. These centers will promote coordination, collaboration and consistency in their respective regions, as well as

- **Train educators and future leaders**
- **Coordinate regional services, including working with other institutions of higher education in their areas.**
- **Develop programs and curriculum**
- **Conduct research which will generate extramural funding**



This recommendation addresses two great needs in Kentucky's system of environmental education. One of these is the improved preparation of those who teach others about the environment; the other is the more effective use of the many environmental education services already available. By establishing centers at each regional university, this recommendation creates a unique entity that would serve as both a statewide network for the coordination of services and a force for change within each institution.

We are asking the General Assembly to provide \$900,000 annually to fund all eight centers. This amount is less than that of many university centers at just one location. The lower cost reflects the fact that none of these centers stands alone, but works as part of a network that shares information and tasks. The \$900,000 would cover the costs of staff plus minimal operating funds. The universities would provide such services as office space, computers and telephones. Additional program and operating costs would be raised from other sources.

We are requesting that these funds be put into the KEEC budget, which will then contract with each university to have the centers established by December 31, 2000. Through Memorandums of Agreement, KEEC will insure that the centers work cooperatively across the state to improve environmental literacy.



10

Colleges and universities in Kentucky should strive to improve the environmental literacy of all their students. Collaborative interdisciplinary courses need to be developed that link ecology and other natural sciences, social sciences, the humanities, and teacher education. The environmental education centers will expedite the creation of these courses and therefore should be placed administratively to best facilitate cross-disciplinary collaboration.



photo courtesy Kentucky Department of Travel Development

Colleges and universities in Kentucky should take advantage of the many curricular models available to improve environmental literacy among postsecondary students. One of the roles of the centers will be to guide these curricular changes.

No student should leave a Kentucky college or university without a basic understanding of the interaction of natural and socioeconomic systems. Both our ecological and our economic future depend on this understanding, especially among our leaders. Numerous models have been used successfully to improve the environmental literacy of college students. The KEEC and the univer-

sity centers will disseminate information about these models.

To improve the environmental literacy of their students and the preparation of teachers to teach about the environment, colleges and universities should choose to create new courses and modify existing ones. To assist with this improvement, KEEC will raise funds through private sources to sponsor summer institutes for faculty, the first of which will be held in the summer of 2001. Funds will also cover faculty release time and stipends. Annual costs for the program are \$200,000.

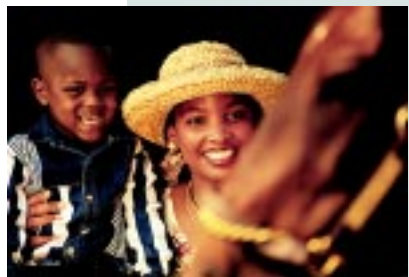


photo courtesy Kentucky Department of Travel Development

11 Kentucky teachers need to be better prepared to teach about the environment. This preparation requires significantly higher levels of environmental literacy and demonstrated competency in instructional models and methods. Environmental knowledge is based on knowledge of ecological concepts and principles.

Courses that prepare teachers to teach about the environment should contain experiences consistent with educational reform, including child-centered, experiential, collaborative learning. A major role of the environmental education centers will be to guide these changes in teacher preparation and professional development.

Two things need to happen if Kentucky's teachers are to be better prepared to teach about the environment. First, they must have a stronger background in the subjects that are the basis of environmental education, including, but not limited to, ecology. Second, they must know the most effective techniques for presenting that knowledge to students.

Classrooms across Kentucky operate differently than they did twenty years ago. Now students learn by doing actual projects. They work in teams to gain both knowledge and skills useful in real-world settings. National research shows that there simply is not a better vehicle for providing these kinds of experiences than environmental education. Teacher education students who experience this kind of learning themselves will be much more successful applying it to their own classrooms, a gain both to environmental education and to education in general.

The faculty development project described in recommendation 10 will also be used to enhance teacher education courses.





Reaching Kentucky's Adults

While it is essential that young people become environmentally literate, adults make the lifestyle decisions that affect Kentucky's environment. Therefore the goal of this plan is to teach adults the environmental consequences of their personal actions, as well as how environmental policies affect them. In order to gain this understanding, adults should know such basic ecological concepts as watersheds, ecosystems, biodiversity, and energy transfer, among many others.

This section of the master plan focuses on improving the environmental literacy of the general adult population. It does not address the education of the regulated community, but rather focuses on providing knowledge that will help adult citizens make day-to-day decisions about environmental issues facing their communities.

12 State agencies should organize a cooperatively produced program to improve adult environmental literacy.



photo courtesy Kentucky Department of Parks

One of the least served audiences in the state, with respect to environmental education, is the general adult population. State government agencies that deal with the environment have the expertise to provide basic information needed in any adult education program about Kentucky's natural resources. This recommendation calls for applying the valuable resource represented by the combined expertise of state environmental personnel to the very great need for improved environmental literacy in the adult population. Such a program would be strengthened by using the standards being developed by the KEEC for environmental education in Kentucky.

This recommendation does not require additional state funding but its implementation would require some shifting of funds from current programs to new ones. The scale of the projects would determine total costs. By carrying out the evaluations suggested in recommendation 17, agencies can streamline current programs and thus find funds for addressing adult literacy. Agencies should also be encouraged to seek funds from foundations and federal sources to begin this process. (See recommendation 13.)

The KEEC will work with the Interagency Committee described in recommendation 18 to begin working on this project in early 2001.

13 The KEEC should seek funding from outside state government to create a pilot project in adult environmental literacy. This project should help people understand how environmental knowledge can lead them to make informed decisions about environmental issues.

Most adults are unaware of the importance of environmental knowledge in their everyday lives. They have a limited understanding of ecological concepts or of the impact their personal actions have on the environment. (See the end of this document for the results of Kentucky's first statewide environmental literacy survey.) We propose to seek private funding for an innovative project that first helps people understand why they need to be environmentally literate, then helps agencies and organizations with interests in the environment to cooperatively provide information to the general public. We will implement this project in one educational service region in the state and then develop a statewide program based on what we learn from the pilot project. We will then form partnerships in each region to execute similar programs. One of the major goals of this project is to form coalitions of agencies and organizations who will cooperatively address adult environment literacy on a continuing basis.

Costs for this pilot project would be approximately \$100,000, which would be raised initially from private sources. The goal of the project is to create partnerships among the various agencies and organizations in each region that now provide environmental education. Combining efforts should save the agencies money and produce more effective environmental education for adults. Fundraising for the pilot phase will begin in the summer of 2001.

14

A survey of the environmental literacy of the general adult population of Kentucky should be conducted every five years. The results should:

- Assess the environmental knowledge, attitudes and behaviors of Kentuckians
- Identify gaps in environmental knowledge in order to determine how to increase the environmental literacy of the state's residents
- Better assess the attitudes and reported behaviors of Kentuckians and aid in the efforts to educate and inform citizens concerning environmental topics

Something as complex as environmental literacy is not easily measured, especially in a survey format. Nevertheless, it is possible to get a "snapshot" view of some of the things Kentuckians know at any given point. This recommendation suggests that taking this periodic snapshot will help inform educators about those areas of environmental knowledge that may need to be enhanced. The Master Plan committee on Adult Literacy created a survey, which was administered in the spring of 1999. The results of this survey begin on page 17. These results will serve as baseline data to measure progress in improving adult environmental literacy in coming years. Costs to administer and analyze such a survey are approximately \$15,000. These funds will come from the KEEC budget.



photo courtesy Kentucky Department of Fish and Wildlife Resources



Creating an Efficient System

The goal of the recommendations in this section is to create a more effective and efficient system of environmental education in the Commonwealth.

Like most states, Kentucky already has a complex system of environmental education; however, that system has grown haphazardly over the years with limited coordination or consistency, leading to great duplication of services in some areas and to gaps in others. Since so little funding is devoted to teaching children and adults about the environment, we can scarcely afford to waste a dime of that funding on an inefficient system. The recommendations in this section suggest ways to help state agencies focus their resources more efficiently and ways that formal and nonformal educators can work more effectively together. Perhaps most importantly, the recommendations list criteria for evaluating programs.

15 The Kentucky Environmental Education Council should be fully funded, including two additional positions for professional staff.



photo courtesy Kentucky Department of Travel Development

The legislation that created KEEC calls for hiring four staff members but provides enough funding for only two of those positions. Currently the Council receives a total of \$150,000 a year from environmental fines and penalties. This amount must cover salaries, benefits for both staff plus operating expenses, and since the amount does not increase, each time staff receive a salary increment, operating expenses are reduced.

Even a cursory reading of this plan shows what a massive job it will be to raise the environmental literacy of Kentucky's citizens. Therefore this recommendation calls for funding all four of the positions listed in the establishing legislation and for paying those salaries from the General Fund, thus freeing the entire \$150,000 from grants and penalties to help implement the plan and to provide grants to schools. The total needed to fund all four positions, including benefits, is \$190,000 in fiscal year 2000/2001.

16 The environmental education centers described in recommendation 9 should also house a full time environmental education coordinator whose task is to ensure that the nonformal environmental educators in their region work effectively with the formal education community.

While there are many environmental resources available, most teachers are unaware of them and need help to use them most effectively. The environmen-

tal education coordinators, while they would be housed in the university centers, would work throughout their regions coordinating services between the formal and nonformal education communities. They would work with both the regional service centers and individual schools.

Costs for these key positions would be \$400,000 in fiscal year 2000/2001. These positions should be filled and operating by January of 2001.

17 Programs that deliver environmental education should be evaluated regularly, using the criteria listed below. These criteria should also be used in developing new programs. Programs should be evaluated every two years and the results sent to KEEC. Evaluated programs will then be highlighted in the KEEC database.

Few environmental education programs are systematically evaluated; some have been operating for decades without a serious assessment of their effectiveness. While these programs may deliver excellent services, there is no way to be certain without periodic evaluations. Furthermore, many environmental education programs use outdated and ineffective methods to deliver their information. Applying the simple criteria listed below could yield significant improvements to both existing and new programs across the state. Individual agencies and organizations would conduct these voluntary evaluations. KEEC would assist if requested.

Evaluation criteria:

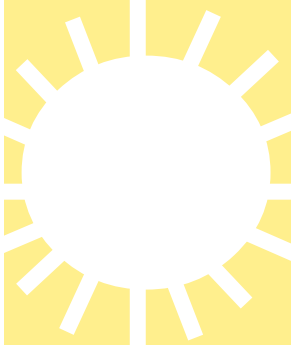
- Do appropriate experts in the field evaluate the program on a regular basis?
- Have measurable goals been established for the program and are they used in the evaluation?
- Is the content of the program balanced with respect to the various issues involved?
- Is the program cost effective? Especially if it is a statewide program, does it build systemic, sustainable improvement?
- Is the program proactive? Does it reach those who need the services as well as those who request them?
- Are there follow-up activities built into the program where appropriate?
- Does the program focus on Kentucky issues or how Kentucky issues relate to global issues?
- Do the methods used to deliver information in the program use the best available technologies and the most audience appropriate formats?

Additional criteria for school programs

- Did a professional, Kentucky-based educator assist in the development of the program?
- Has it been reviewed by the Department of Education and by teachers?
- Is it part of an ongoing unit being taught in the school, rather than a “drop in” activity?



photo courtesy Kentucky Department of Travel Development



This recommendation pays for itself. By evaluating existing programs using these criteria, agencies can streamline and make those programs more efficient and more effective. While this process is entirely voluntary, the KEEC will work through the Interagency Committee described in recommendation 18 to encourage these evaluations. That process will begin in September, 1999.

18

A Cabinet level interagency committee should meet quarterly to ensure that state administered environmental education programs are effective, efficient and accessible.



photo courtesy Kentucky Department of Parks

A Kentucky Environmental Education Council Interagency Committee should be reestablished at the Cabinet level in state government and this committee should meet quarterly. Cabinet Secretaries should be charged with evaluating their environmental education programs and insuring that programs in state government that teach about the environment cooperate and communicate to produce effective and efficient programs. This committee should be formed with (at least) the Secretaries of Education, Tourism, Agriculture, Economic Development, and Natural Resources & Environmental Protection. Representatives should also be appointed from the Council on Postsecondary Education and the Coal Marketing Export Council.

All these Cabinets and agencies have substantial programs in, or influence on, environmental education. We recommend that the persons appointed to serve on this committee have sufficient authority to make meaningful decisions about programs.

Seventeen separate state agencies conduct some kind of environmental education. Some of these programs are quite small and represent only a portion of one person's time. Others devote the work of whole departments to environmental education. No matter their size, most state programs attempt to be all things to all people. That is, they try to teach directly in the schools, to work with adult groups and to provide information and education to the regulated community as well. Further, since each agency teaches about its own environmental niche (i.e., water, forests, wildlife, energy, etc.) environmental education provided by state agencies tends to be fragmented. The goal of establishing this committee at the Cabinet level is to make it possible to consider real changes that would make environmental education services by state government more effective, more efficient and more accessible.

No additional funding is required for this recommendation. As with recommendation 17, implementing this recommendation would actually help make environmental education programming by state government work more efficiently. This committee should begin meeting in the fall of 1999.

19 KEEC will provide professional development opportunities to environmental educators in the nonformal sector. The purpose of this professional development is to assure that nonformal environmental education supports the Program of Studies.

The nonformal education sector provides at least as much environmental education as those in the formal school and college setting. Those in the nonformal sector represent staff in state and federal agencies, parks, nature centers, and business and industry. While many of these people are highly trained educators, others are experts in particular environmental fields who have little background in curriculum development or instructional methods. Since the nonformal environmental education community provides so much environmental education to our students and adult citizens, this recommendation addresses the need for them to receive training that helps them:

- Gain a better understanding of how the information they provide fits in with what students need to know at each grade level.
- Gain a better understanding of how to work with teachers to enhance ongoing environmental learning rather than “drop in” environmental programs.
- Learn improved instructional strategies to provide environmental education in age appropriate formats.

The KEEC is currently working with several agencies to create a workshop and guidebook to implement this training. Training should begin in the fall of 1999. Costs will be covered by KEEC funds.

20 Nonformal educators should provide technical assistance and support services to teachers as the teachers integrate environmental education into the curriculum.

Because many teachers feel unprepared to teach about the environment but wish to provide at least some environmental education to their students, a situation often arises in which a nonformal educator is asked to come into the classroom and make a one-time presentation about an environmental topic. While these presentations sometimes supplement a larger environmental unit the teacher is teaching, just as often they are taught in a vacuum with neither preparation nor follow-up for the presentation. This is a less than ideal way to provide environmental education.

This recommendation asks both teachers and nonformal educators to work together to provide a better experience for the students, with the teacher providing the educational expertise (and the knowledge of her students) and the nonformal educator providing technical assistance about specific environmental topics. The “message” of this recommendation will be delivered in workshops KEEC will provide for both teachers and nonformal educators. KEEC funds will support these workshops.

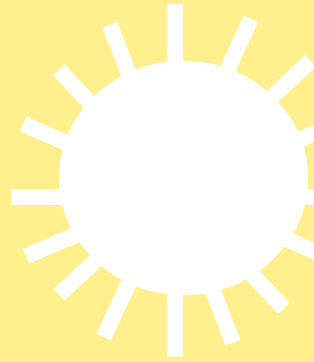


photo courtesy Kentucky Department of Travel Development



The Current Status of Environmental Knowledge in Kentucky

Do we need environmental education in Kentucky? Or do Kentuckians already have the knowledge they need to make informed decisions about the environment? As part of the master plan process, the committee on adult literacy created a survey that would not only ask some basic questions about Kentuckians' knowledge of the environment, but also examine their attitudes and behaviors.

It should be noted that this survey does not in any way measure the environmental literacy of Kentuckians. Environmental literacy is very difficult to define, let alone measure. This survey, conducted by the University of Kentucky Survey Research Center on a random sample of 668 adults in March 1999, is simply a snapshot of whether Kentuckians can answer some very basic questions about issues that deal with air, land and water quality. It also asks Kentuckians to share their attitudes about certain environmental issues such as how well we are protecting our natural resources. Finally it asks Kentuckians to identify whether or not they engage in behaviors that might improve the environment.

Please note that all percentages have been rounded to the nearest decimal for easier reading.

Results of the Survey

KNOWLEDGE

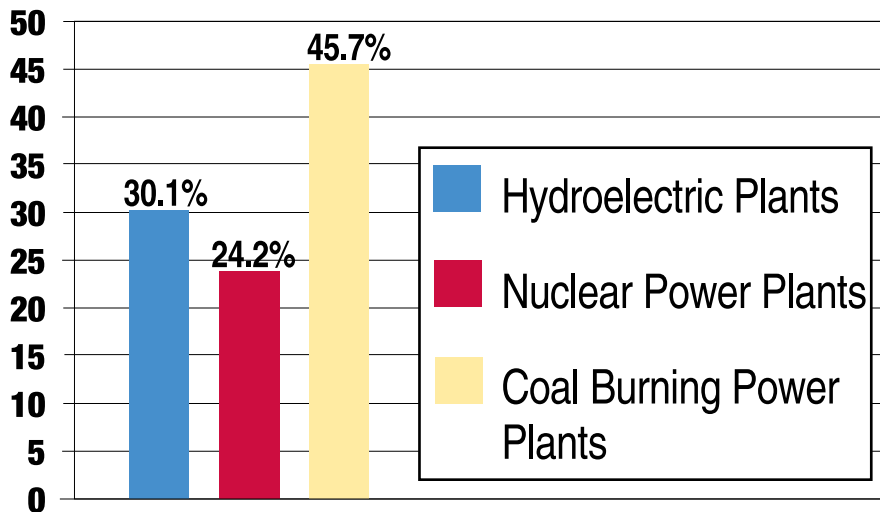
The survey asked eleven questions that measured Kentuckians' knowledge of current environmental topics. The committee designed the questions to be extremely easy. These are questions that any sixth grader should be able to answer; as expected, a majority of the respondents to the survey were able to answer many, though not all, questions correctly. However, for most questions, a large minority of respondents was not able to give correct answers to these very basic questions.

Kentuckians did well answering questions that are "hot topics" in the media. For example, 81% of respondents know that the major benefit of the ozone layer is protection from cancer-causing ultraviolet rays. Eighty-nine percent know that the primary method of dealing with nuclear waste is to store it underground. Ninety-five percent know that paints, acids, and pesticides are considered hazardous waste, while glass, newspapers, and most building materials are not.

On topics not highlighted as strongly by the media, respondents did less well. For example, while 61% of those surveyed know that solar energy and trees are renew-

able resources, a full 39% think coal, oil, iron, and other metals are also renewable resources. While 49% of respondents correctly identify the best definition of “biodiversity” as the many different types of plants and animals, another 40% think biodiversity is the many differing opinions on environmental issues. Seventy-two percent of those surveyed correctly identify the primary benefit of wetlands as helping to clean water systems, but a full 18% think the primary benefit of wetlands is to reduce the number of plant and animal species in an area, and another 10% think they are useful for the development of landfill sites.

Percentage of Kentuckians Surveyed Who Correctly Identified Coal as the Largest Source of Electricity in the U. S.



Seventy-three percent of respondents correctly identify landfills as the primary destination of household garbage in the U.S., but another 23% (perhaps understandably) identify illegal dumps as the primary destination of household garbage. Surprisingly, only 46 % of those surveyed are able to identify coal-burning power plants as the number one source of electric power in the U.S. Fifty-five percent believe the primary source of electricity is either hydroelectric power or nuclear power. This is of special concern in a state where electricity costs are relatively low due to our proximity to coal and where coal, the jobs it creates, and the way it is mined are major sources of public debate.

When asked about the most common reason for the extinction of plants and animals, 62% of respondents correctly identify habitat loss. However another 30% believe poisoning is the most common reason for the extinction of plants and animals, and another 8% identify overhunting as the cause. A fairly large percentage of respondents (73%) correctly identify fumes from motor vehicles as the leading source of carbon monoxide in the air, while another 24% incorrectly believe most carbon monoxide comes from factory emissions.

Respondents incorrectly identify the leading source of water pollution as household waste in sewers and landfills and the second leading cause as factory runoff. Only 21% correctly identify runoff from city streets, farms and yards as the leading source of water pollution. This statistic is especially interesting since, when asked to identify the most important environmental problem in Kentucky, the most common answer (23%) is water pollution. Fifteen percent identify air pollution as the most important environmental problem and another 15% identify littering and illegal dumps as the most important issues. See the chart on page 20 for the five most important environmental problems identified by those surveyed.

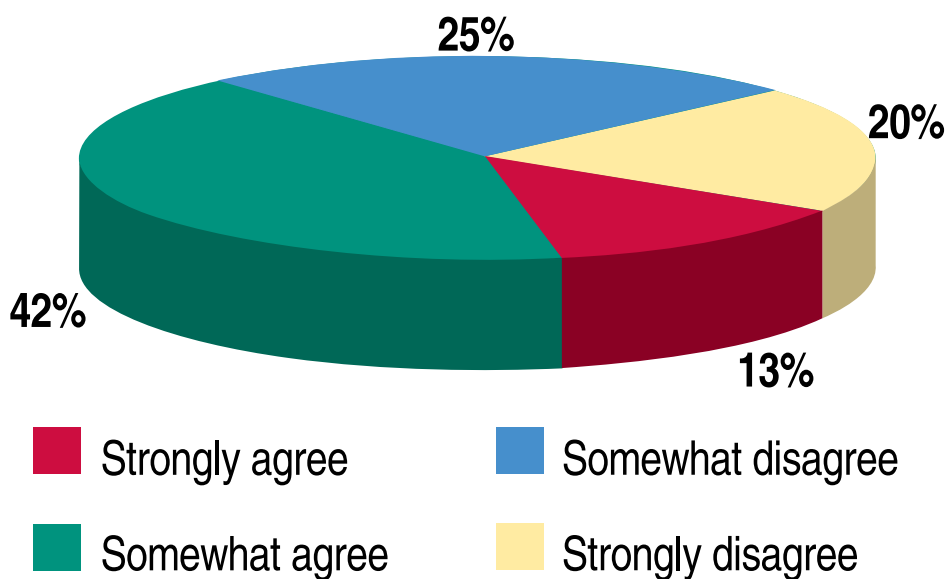


ATTITUDES

The next ten questions in the survey asked Kentuckians to give their opinions on various questions concerning the environment. Kentuckians surveyed tend to believe their local environment is better than the environment in general. For example, when asked to rate the quality of water in general, 44% said that water quality is good or excellent. When asked about the quality of the water in their area, 52% identify their water as either excellent or good. The differences in opinions on air quality are somewhat larger. While only 40% of those surveyed rate air quality in general as excellent or good, 62% rate air quality in their own area as excellent or good.

When asked whether specific areas of the environment are adequately protected, a majority of Kentuckians surveyed said yes. Sixty-nine percent either agree or strongly agree that wild and natural areas are adequately protected. A smaller percentage, 57%, believe wetlands are adequately protected. A small majority believes forests are adequately protected (55%) and a larger majority (63%) believes endangered species of plants and animals are adequately protected.

Survey Responses to the Statement, “Forests are Adequately Protected.”



Perhaps the most controversial question in the survey asked respondents whether private landowners should be able to use their land in any way they see fit. Approximately half of all Kentuckians surveyed (52%) agree with this statement, while another half (48%) disagree. This 4% difference is right at the margin of error for the survey and thus may be due to sampling error. Therefore Kentuckians are essentially evenly split on this issue. Not surprisingly, a far greater majority of farm dwellers (65%) agree or strongly agree that private landowners should be able to use their land as they see fit than do those who live in cities of 50,000 or more. Only 43% of city dwellers agree or strongly agree with this statement.

When asked whether human activity is causing the depletion of the ozone in the upper atmosphere, 75% of those surveyed agree with this statement. When asked whether they believe it is possible to have a healthy economy and protect the environment, a whopping 95% say yes.

Finally, when asked whether environmental education should be taught in the schools 96% agree that it should. This is almost exactly the same percentage reported in nationwide polls on environmental education.

BEHAVIORS

The final section of the survey concerned reported behaviors that affect the environment. Respondents were asked to report behaviors or beliefs that would have a positive effect on the environment. Although readers should be aware that positive behaviors are often over reported, Kentuckians surveyed do report a strong interest in protecting the environment. For example, 95% of those surveyed report that knowing about environmental problems is important to them. Another 65% report donating time or money to pro-environmental groups either frequently or sometimes.

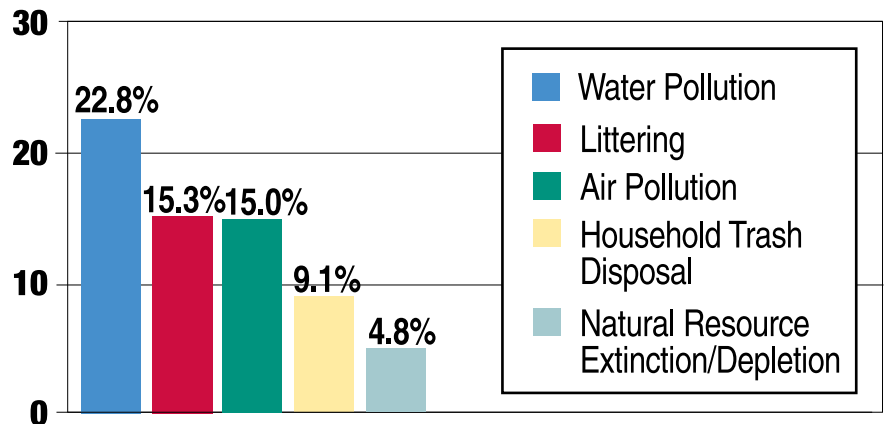
Eighty-four percent of those surveyed report that they frequently or sometimes avoid buying products with extra packaging, and 86% report that gas mileage is an important consideration in buying a new vehicle. Ninety-three percent report they frequently or sometimes attempt to reduce the amount of household waste, and another 73% report separating waste for recycling. When asked if they ever planted trees to improve the environment, 28% report that they do so frequently and another 41% say they do so sometimes.

Kentuckians surveyed were asked if they would be willing to pay more for gas, electricity or heat in order to protect the environment. Seventy-three percent say that they would. When asked how much more, 46% say they would be willing to spend 5% more and 29% say they would be willing to spend an additional 10% in order to protect the environment. In a similar question about other goods and services, 79% of those surveyed report that they would be willing to pay more for goods and services in order to protect the environment. Forty-seven percent say they would pay 5% more and 28% say they would pay 10% more for goods and services in order to protect the environment.

In a final question, Kentuckians surveyed were asked whom they would call if they had a question about the environment. These were the top five answers: a federal environmental agency such as the EPA (23%), a state environmental agency such as a university (18%), a local environmental agency such as the county health department (16%), or the Cooperative Extension Service (9%). Another 4% would go to the Internet for information about the environment.

Those who responded to the survey were asked in what type of community they lived, how long they had lived in Kentucky, their ages, genders, education and income levels. The KEEC will publish a more in-depth analysis of the results of the survey in the fall of 1999.

Top Five Responses to the Question, “What is the Most Important Environmental Problem in Kentucky?”





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Nancy Fouser
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and Environmental Protec-
tion Cabinet

Nancy Fultz
American Cave Conserva-
tion Association

Sharon Ganci
Mammoth Cave National
Park

Oscar Gerald
Sierra Club

Marcelle Gianelloni
Louisville Zoo

Bob Hughes
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Cooperative

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Jennifer Woods
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